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Improving Utilization of Infrastructure Cloud

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Abstract- *A key advantage of Infrastructure-as-a-Service (IaaS) cloud is providing users on-demand access to resources. However, to provide on-demand access, cloud providers must either significantly overprovision their infrastructure (or pay a high price for operating resources with low utilization) or reject a large proportion of user requests (in which case the access is no longer on-demand). At the same time, not all users require truly on-demand access to resources. Many applications and workflows are designed for recoverable systems where interruptions in service are expected. For instance, many scientists utilize High Throughput Computing (HTC)-enabled resources, such as Condor, where jobs are dispatched to available resources and terminated when the resource is no longer available. We propose a cloud infrastructure that combines on-demand allocation of resources with opportunistic provisioning of cycles from idle cloud nodes to other processes by deploying backfill Virtual Machines (VMs).*

Keywords: *Infrastructure as service, High Throughput Computing, Virtual Machine, idle cloud.*

I. INTRODUCTION

In the recent years, Infrastructure-as-a-Service (IaaS) cloud computing has emerged as an attractive alternative to the acquisition and management of physical resources. Infrastructure clouds are usually those offerings which give you an infrastructure like Windows Azure or Amazon upon which you can build almost any application. The on demand provisioning it supports allows users to elastically expand and contract the resource base available to them based on an immediate need – a pattern that enables a quick turnaround time when dealing with emergencies, working towards deadlines, or growing an institutional resource base. This pattern makes it convenient for institutions to configure private clouds that allow their users a seamless or near seamless transition to community or commercial clouds supporting compatible VM images and cloud interfaces. Such private clouds are typically configured using open source IaaS implementations such as Nimbus or Eucalyptus [1].

The illusion of infinite computing resources available on demand thereby eliminates the need for Cloud Computing users to plan far ahead for provisioning. The elimination of an up-front commitment by Cloud users, thereby allowing companies to start small and increase hardware resources only when there is an increase in their needs. The ability to pay for use of computing resources on a short-term basis as needed (e.g., processors by the hour and storage by the day) and release them as needed, thereby rewarding conservation by letting machines and storage go when they are no longer useful.

The system is very much needed in the current and future also. When we deal with any massive operation then in such case available computing resources are not sufficient. To perform the operation on the individual machine having the limited memory and processing power, it takes too much time to perform operation. But with this research we will be able to perform the task by using cloud computing. The use of the cloud computer will save the time of the operation. Also the use of the cloud computing will use the available resources very efficiently. So this research will be very useful when we have to perform the operation very fast and using optimal resources.

As Clouds are emerging as next-generation data centers and aim to support ubiquitous service-oriented applications, it is important that they are designed to be energy efficient to reduce both their power bill and carbon footprint on the environment. To achieve this at software systems level, we need to investigate new techniques for allocation of resources to applications depending on quality of service, expectations of users and service contracts established between consumers and providers.

II. LITERATURE SURVEY

A) Infrastructure as a service (IaaS)

IaaS provides simple provisioning of processing, storage, networks, and other fundamental computing resources over a network. With IaaS, IT services can be delivered as a subscription service, eliminating up-front costs and driving down ongoing support costs (enabling companies to make a strategic shift from a CAPEX to OPEX-based business model). As with managed hosting, IaaS providers keep costs low by pooling resources and giving customers access to a shared facility. But a major difference is that IaaS resources are elastic and available on a self service, on-demand basis.

While IaaS providers often differ in their specific offerings, key features of all IaaS models include:

- Instant deployment
- Ability to rapidly scale
- Lower TCO
- Predictable uptime

B) GPS tracking

Google's mobile version of Google Maps has always offers the ability for mobile phone users to call up Google Maps to view the map of a particular location or search for driving directions. Later, Google added the ability for users who had a GPS-enabled phone or Smartphone to locate their current location through satellite triangulation.

This is a very useful feature of Google Maps, and one that sets it above most other free mobile mapping applications. However, since such a small percentage of Google Mobile users actually own a GPS-enabled phone, Google decided to add GPS Tracking to Google Maps. It's an amazing technology that offers any cell phone user, regardless of GPS functionality, the ability to zero on your current location. Google Maps does this the moment you start up the application on your cell phone, as shown here on my Cingular Smartphone.

Tracking a GPS enabled cell phone on Google maps Project includes J2ME cell phone source and source code to display data on your own website. One can choose between .NET and MS SQL Server or PHP and MySQL.

III. METHODOLOGY

This research covers two basic aspects

1. GPS location tracking-

This part follows tracking users' location through Google apps, hence registering a particular user in a location hence finding out the area of his searching.

2. Efficient request processing through infrastructure clouds

The processing of the request is processed through efficient scheduling of the task assignments to the virtual nodes. The concept is implemented through FIFO scheduling and map-reduce of the Hadoop infrastructure.

The data to be searched should be kept available on the cloud servers, so that the request would be directed to these servers through cloud computing. This request processing takes the input as the current user location along with the user's search query and processes it through cloud to give the asked results that would be displayed on the user's cell phone.

Also infrastructure cloud takes care of load balancing that can be a very tedious aspect when seen through a large request processing system's point of view. This feature is elaborated through sending multiple threads of the request and hence testing the system's load balancing capability.

This research is tied to the boundary where it can process a request which is asked for the information that is basically satisfied by knowing the particular location of the user at current time.

This location tracking is possible only when the user is connected to the internet through his cell phone. Particularly the application should be deployed on his cell phone and he must have the authorization to use it.

Also the load balancing part of the system is seen to be satisfied by sending many numbers of requests to the system within a short interval of time. A graph showing the efficient utilization of all the nodes is able to explain the working of cloud against the time axis.[3]

IV. SYSTEM CONSIDERATIONS

- *Location Tracking:*

It is done through Google App

- *Request Processing*

The requests are handled through cloud installed on hadoop server implementing the concept of map-reduce.

- *Load balancing*

It is achieved through assigning the task in FIFO ordering to the virtual cloud nodes. For that the upcoming task is guided to the node which is idle for the current instance of time, thereby reducing the waiting time of the request.

V. DESIGN CONSIDERATIONS

A) General constraints

Design is the technical kernel of the software development. The Design specification addresses aspects of the design model. Software (IDE) like Netbeans 7.0 is required. Implementation includes all those activities that take place to convert from the old system to the new. The old system consists of manual operations, which is operated in a very different manner from the proposed new system. A proper implementation is essential to provide a reliable system to meet the requirements of the user. An improper installation may affect the success of the computerized system.Internet connectivity is essential for this product. It requires a latest supported browser. For latest update from Microsoft like AJAX toolkit you require Internet Connectivity. Also it can help you to recovery in IDE crash or stop working.

B) Development Methods

The development model is a spiral model. The spiral model combines the idea of iterative development (prototyping) with the systematic, controlled aspects of the waterfall model. It allows for incremental releases of the product, or incremental refinement through each time around the spiral. The spiral model also explicitly includes risk management within software development. Identifying major risks, both technical and managerial, and determining how to lessen the risk helps keep the software development process under control[4].

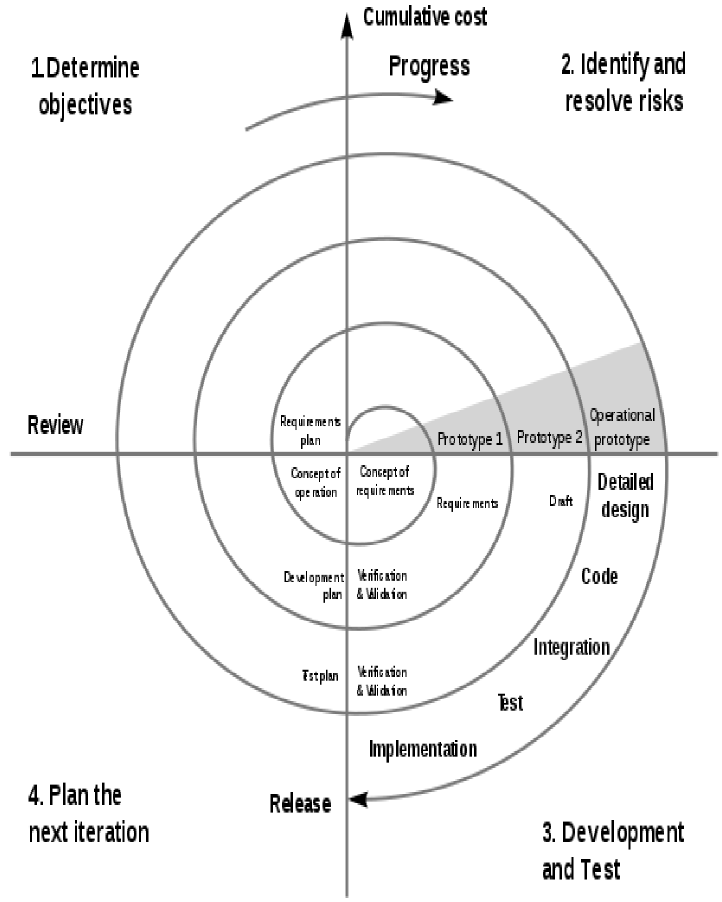

Figure 1: spiral model

Starting at the center, each turn around the spiral goes through several task regions:

- Determine the objectives, alternatives, and constraints on the new iteration.
- Evaluate alternatives and identify and resolve risk issues.
- Develop and verify the product for this iteration.
- Plan the next iteration.

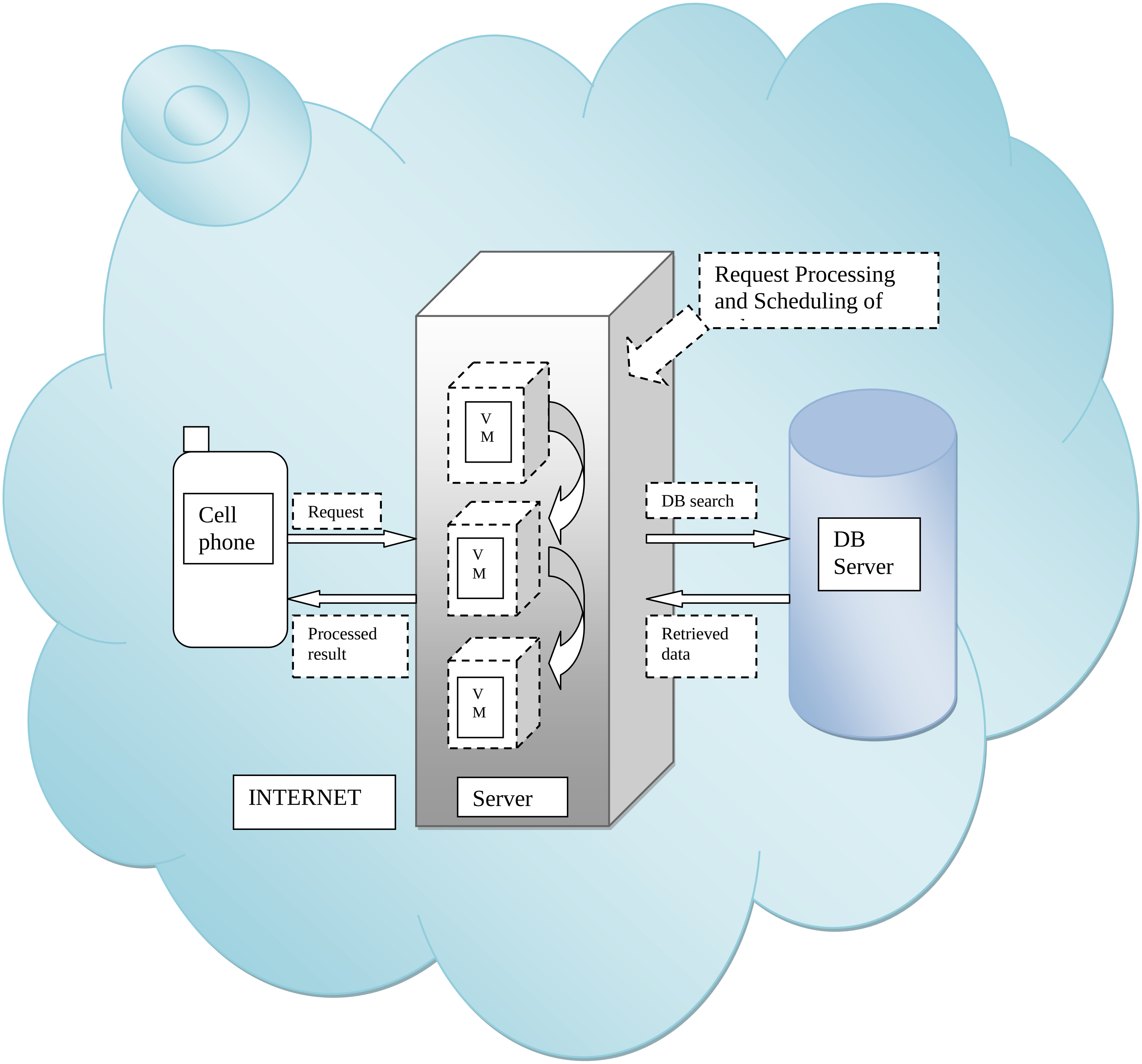

Figure 2 System Architecture

VI. RESULTS

Results of the researsh carried out are shown as below

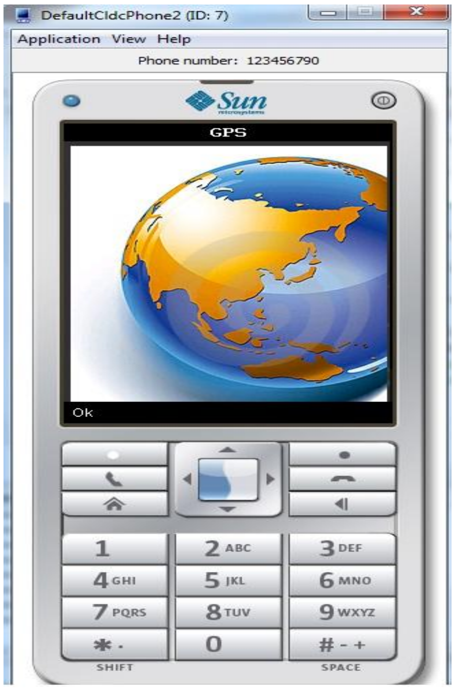

Figure 3. Home Screen

Figure 3 shows the home screen of this research.

Figure 4. Menu Selection Screen

Figure 5. Login Screen
This figure shows login screen.

Figure 6. Input Screen

Figure 4 & 6 shows menu selection & Input screen.

Figure 7. Information Retrieval

Figure 8. Map Retreival

Figure 7 shows the information retrieval after giving some input & Figure 8 shows map releated to information that is retrieved.

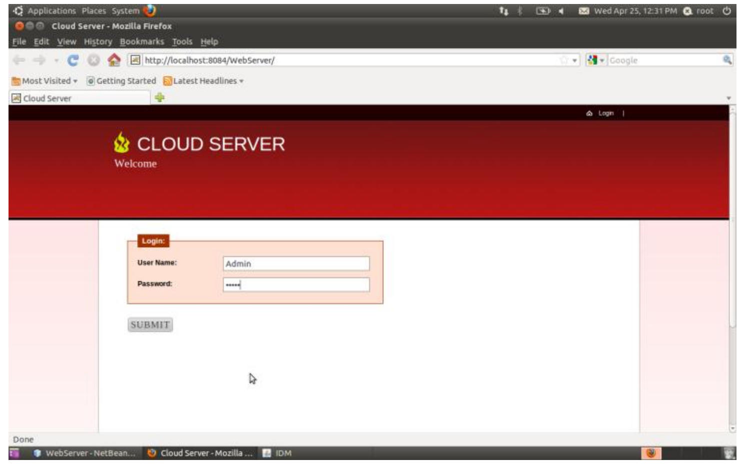

Figure 9 . Login to Database Server

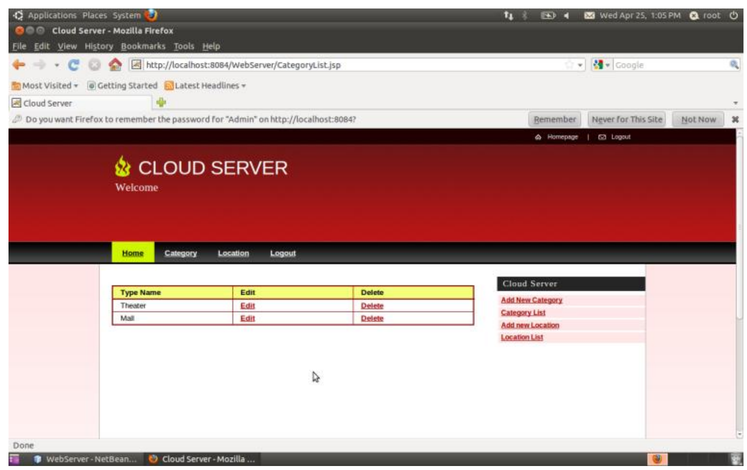

Figure 10 . Home page at Server Side

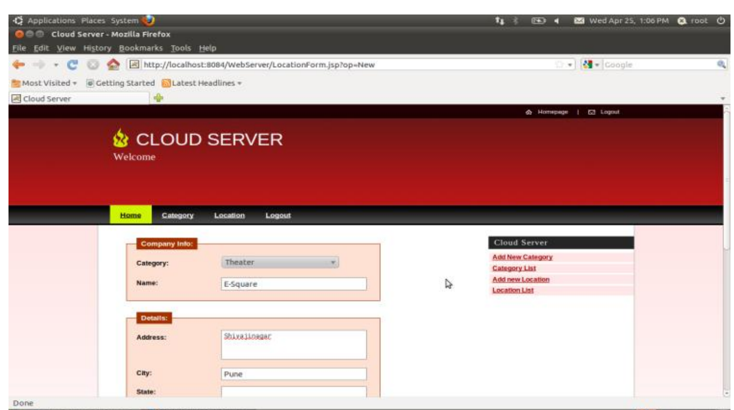

Figure 11 . Add New Record

Figure 9, 10, 11 shows server side login page & Insertion of new record.

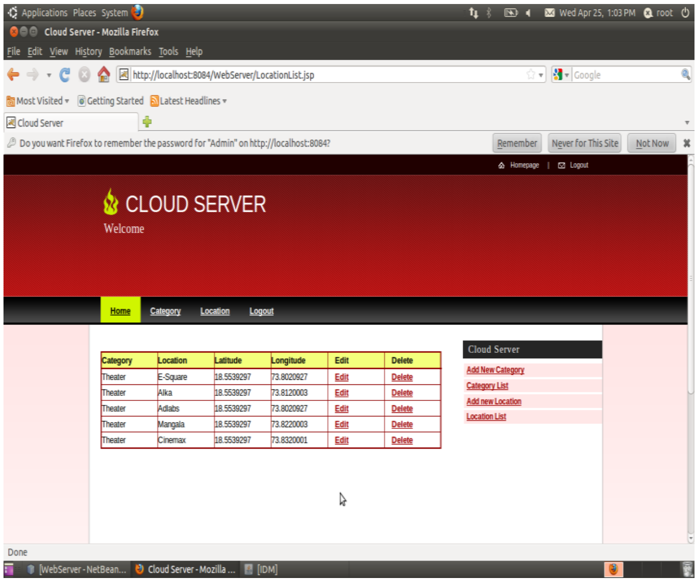

Figure 12. Existing Database

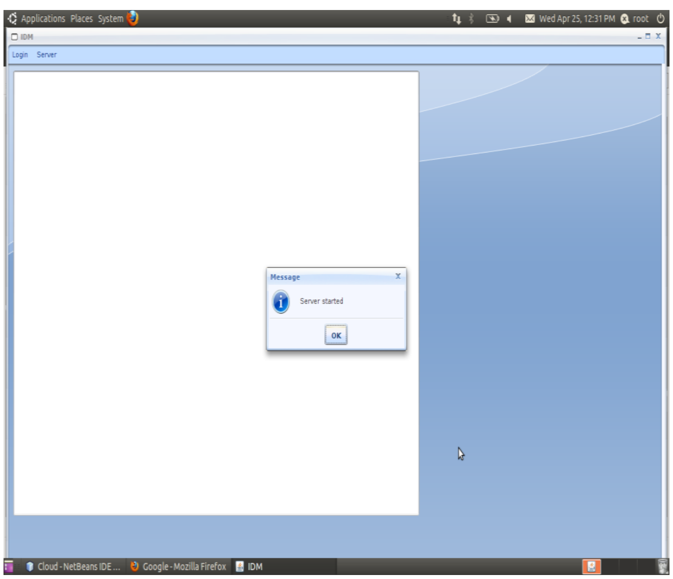

Figure 13. Cloud Server

VII. FUTURE ENHANCEMENTS

Even though the system has succeeded to achieve the said goal, the system can be enhanced by doing some additional work in upcoming future. They can be summarized as

- Standard security algorithms can be implemented to enhance the security.
- The systems working could be made autonomous.
- The backup of the database can be taken periodically to optimize recovering from the crash or failures.
- The application can be made compatible for various operating systems.

VIII CONCLUSION

This research achieves the goal of its desired functions, which are GPS tracking, and efficient request handling through cloud computing.

The research hence reassures the effectiveness of using Infrastructure clouds when the system needs to meet the requirement of high load.

In this paper we propose a cloud infrastructure that combines on-demand allocation of resources with opportunistic provisioning of cycles from idle cloud nodes to other processes, by deploying backfill VMs.

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